

What is claimed is:

1. A method of decreasing viscoelasticity of respiratory tract mucus comprising administering to the mucus an effective amount of charged dextran.
- 5 2. The method of claim 1 wherein the charged dextran is a low molecular weight dextran.
3. The method of claim 2 wherein the molecular weight of the dextran is from 500 to 5000.
- 10 4. The method of claim 1 wherein the charged dextran is dextran phosphate or dextran sulfate.
5. The method of claim 4 wherein the charged dextran is dextran sulfate.
6. The method of claim 3 wherein the charged dextran is dextran sulfate.
- 15 7. The method of claim 1 for improving mucus clearance from the respiratory tract of an animal in need thereof comprising administering to the animal an effective amount of charged dextran.
8. The method of claim 7 for treating an animal with impaired mucus clearance.
- 20 9. The method of claim 8 wherein the impaired mucus clearance is associated with a lung disease.
10. The method of claim 9 wherein the lung disease is selected from the group consisting of: cystic fibrosis, chronic bronchitis, brronchitis,

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bronchiectasis, bronchiolitis and bronchial asthma.

11. The method of claim 8 wherein the animal is a horse and the disease is heaves.

12. The method of claim 10 wherein the animal is human.

5 13. The method of claim 12 wherein the disease is cystic fibrosis.

14. The method of claim 7 wherein the effective amount is between about 39 mg to about 552.5 mg.

10 15. The method of claim 7 wherein the charged dextran is administered to the respiratory tract of the animal in the form of a pharmaceutical composition comprising a charged dextran and a pharmaceutically acceptable carrier.

16. The method of claim 15 wherein the pharmaceutical composition is an aerosol and is administered through inhalation.

15 17. The method of claim 16 wherein the charged dextran is low molecular weight charged dextran.

18. The method of claim 17 wherein the molecular weight of the charged dextran is from 500 to 5000.

19. The method of claim 18 wherein the charged dextran is dextran sulfate.

20 20. A pharmaceutical composition for decreasing the viscoelasticity of mucus comprising a charged dextran and a pharmaceutically acceptable carrier.

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21. The pharmaceutical composition of claim 20 wherein the charged dextran is a low molecular weight dextran.

22. The pharmaceutical composition of claim 21 wherein the molecular weight of the charged dextran is from 500 to 5000.

5 23. The pharmaceutical composition of claim 22 wherein the charged dextran is dextran sulfate.

24. The pharmaceutical composition of claim 20 wherein the composition comprises between about 6.5 mg/ml to about 65 mg/ml of dextran sulfate/ml of the composition.

10 25. The pharmaceutical composition of claim 17 wherein the composition is a topical composition.

26. The pharmaceutical composition of claim 17 wherein the composition is an aerosol.

15 27. The method of claim 1 for diagnosing an animal with impaired mucus clearance comprising obtaining a sample of the animal's mucus and treating it *in vitro* with charged dextran, determining the effect of the charged dextran on the viscoelasticity of the mucus to determine whether the animal may have impaired mucus clearance.

20 28. The method of claim 1 for determining a dosage regime of an animal with impaired mucus clearance, comprising:

- (a) obtaining a mucus sample from the animal;
- (b) subjecting aliquots of the mucus sample to different concentrations of charged dextran;

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- (c) measuring the viscoelasticity of each of the aliquots of the mucus sample after administration of the charged dextran, and
- (d) determining the preferred dosage of charged dextran based on comparing the effect of the different concentrations of charged dextran on the viscoelasticity of the mucus sample.

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